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Subject: VUV Injection Shutter LOTO

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Purpose: The shutter-actuating arm of the VUV injection shutter is not readily accessible to Lockout/Tagout (LOTO) due to the significant amount of shielding surrounding it. This procedure provides an alternative method of safeguarding the VUV injection shutter that is nonintrusive to the VUV transport line radiation shielding.

Scope: This procedure is only applicable for situations that involve radiation protection purposes for the VUV ring. A safety review is required for all other purposes of applying LOTO to the VUV injection shutter. The NSLS Safety Officer, Safety Engineer, Interlock Engineer, Quality Representative, Machine Operators, and Operations Coordinators are the only personnel authorized to LOTO the injection shutter. The Machine Operators and Operations Coordinators must receive direction and authorization from any of the other authorized individuals prior to applying LOTO to the VUV injection shutter.

Procedure When VUV Interlock System is Functional and VUV Ring and Transport is Safe for Beam:

1. Inform the control room operator that the VUV injection shutter will be Locked/Tagged.
2. Obtain lockout devices for the solenoid electrical connector and solenoid air valve (e.g. valve lockout device, plug-lockout), 2 padlocks, 2 Hold tags, and 2 cable-ties.
3. Close the air valve to the VUV injection shutter solenoid valve.
4. Secure the VUV ring so that injection shutter may be operated.
5. Request the Machine Operator to observe the shutter “open” and “closed” indicators and then cycle the shutter open and closed three times. Verify that the Operator observed the indicator lights to cycle twice and that the “closed” light remained on for the third cycle. At the shutter location, verify that air discharge is heard from the solenoid exhaust as the shutter cycles, and no air comes out on the third cycle. If more than three cycles are required there may be a leaking shut-off valve or other problem. Contact the NSLS Interlock Engineer or Quality Representative.
6. Disconnect the electrical connector to the VUV injection shutter solenoid.
7. Enclose the solenoid electrical connector in a plug-lockout device and install lock/tag on the device.
8. Place a lockout device over the air valve handle and install lock/tag on the device.
9. Inform the Control Room Operator that LOTO of the VUV injection shutter has been completed.

Procedure When VUV Interlock System is NOT Functional OR VUV Ring and Transport is NOT Safe for Beam:

1. Inform the Control Room Operator that the VUV injection shutter will be Locked/Tagged.
2. Obtain lockout devices for the solenoid electrical connector and solenoid air valve (e.g. valve lockout device, plug-lockout), 2 padlocks, 2 Hold tags, and 2 cable-ties.
3. LOTO the LINAC LEBT valve and low level RF per NSLS Procedure LS-ESH-0012.
4. Close the air supply valve to the VUV injection shutter solenoid control valve. Disconnect the ac power to the solenoid valve and connect the test cord so that local ac power can be supplied to the solenoid.

5. Request the Machine Operator to observe the shutter "open" and "closed" indicators. Plug in the test cord and unplug it to cycle the shutter. Verify that air can be heard coming from the solenoid valve exhaust and that the Operator observed the indicator lights to cycle. Repeat this process until air discharge is no longer heard and the "shutter closed" indicator in the control room remains ON even when power is applied to the solenoid valve. If more than three cycles are required there may be a leaking shut-off valve or other problem. Contact the NSLS Interlock Engineer or Quality Representative.
6. Remove the test cord from the solenoid power connector. LOTO the connector.
7. LOTO the air supply valve in the closed position.
8. Inform the Control Room Operator that the VUV injection shutter has been LOTOed.

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